



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,843	02/24/2005	Minchisa Imazato	112857-389	7734
29175 7590 11/12/2008 BELI, BOYD & LLOYD, LLP P. O. BOX 1135 CHICAGO, IL 60690				
EXAMINER				
ENIN-OKUT, EDUE				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
11/12/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/509,843

Applicant(s)

IMAZATO ET AL.

Examiner

Edu E. Enin-Okut

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 47-55, 58-60 and 78-92 is/are pending in the application.
- 4a) Of the above claim(s) 56, 57 and 61-77 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 47-55, 58-60 and 78-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/01/04, 7/25/07
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I (claims 47-55, 58-60 and 78-92) in the reply filed on July 30, 2008 is acknowledged.

Claims 56-57, 61-75 and 76-77 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected embodiments, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on July 30, 2008.

Priority

2. Acknowledgment is made of Applicant's claim for foreign priority to Japanese Patent Application Nos. 2002-117319, 2002-360491, and 2003-073414 filed on April 18, 2002, December 12, 2002, and March 18, 2003, respectively, under 35 U.S.C. 119(a)-(d). Certified copies of those applications have been received.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "heat sink portion" and "predetermined shape" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and

Art Unit: 1795

where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 47-51, 58-59, 78-81, 83-84, 88-89 and 91-92 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakakibara et al. (JP 02-168565; refer to translation).

Regarding claim 47, Sakakibara discloses a water disposal system [water absorbing member 13, water trapping member 15, drain 31] for disposing water generated during power generation by a power generator [fuel cell] (Figs. 2(A), 2(B); p. 4, para. 3 – p. 5, para. 1; p. 11, para. 5-6), comprising:

- a water-absorbing member [13] extending from the power generator, for recovering and moving the water by utilizing capillary phenomenon (p. 6, para. 2); and,
- a water-retaining member [15] for temporarily accumulating the water (p. 5, para. 4).

Regarding claim 48, Sakakibara discloses the power generator is a fuel cell (Fig. 2(A); p. 5, para. 3; p. 9, para. 5) comprising:

- an anode [fuel electrode 1];

- a cathode [air electrode 2]; and,
- an electrolyte film [3] disposed between the anode and cathode.

As to the anode being supplied with a substance substantially composed of hydrogen as an active anode material; or, the cathode being exposed to air and supplied with oxygen as an active cathode material, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations (e.g., *Ex parte Masham*, 2 USPQ 1647 (1987)). See MPEP 2111.02 (II). However, the anode and cathode of Sakakibara is structurally similar to that instantly disclosed, they appear capable of generating energy when supplied with a fuel such as hydrogen and an oxidant such as air.

Regarding claim 49, Sakakibara teaches a cathode has a current collector [separator 10] formed thereon, an opening [flow hole 21] through which oxygen is supplied to the cathode [2], and a water-absorbing member [13, 15] formed on a circumference of the opening (Figs. 1(B), 2(B); p. 7, para. 4; p. 10, para. 1, 3). One of ordinary skill would appreciate that a cross-sectional view taken along a fuel feeding groove 12 of the fuel cell of Sakakibara as shown in Fig. 2(B) would show a portion of the air electrode 2 formed on the separator 10.

Regarding claim 50, Sakakibara teaches that the water-absorbing member [13, 15] is formed to surround the circumference of the opening so as to cover the opening and to reach the cathode (Figs. 2(B), 4; p. 10, para. 3).

Regarding claim 51, Sakakibara discloses that the water-absorbing member [13] is composed any one of a string-formed material having a void portion formed therein in a longitudinal direction thereof and a porous material having recessed portions on the surface thereof (p. 8, para. 2).

One of ordinary skill would appreciate that a porous material will have a voids with a width of some measure in a longitudinal direction, and it will also have recessed portions on its surface, even though the degree to which that portion is recessed may be slight.

Regarding claims 58-59, the limitations recited in these claims have been addressed above with respect to claims 47-48.

Regarding claim 78, if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction (e.g., *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999); *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997)). See MPEP 2111.02 (II).

Sakakibara discloses a power generation apparatus for generating electric power [fuel cell] by supplying a fuel gas and an oxidizer gas such that the fuel gas and the oxidizer gas can electrochemically react with each other (claim 1), comprising:

- a power generator [fuel cell] having a predetermined electrolyte film [3] provided between a first electrode [1] and a second electrode [2] (Figs. 2(A), 2(B); p. 9, para. 5);
- a separator [10] having, formed thereon, a fuel supply groove [11] for supplying the fuel gas to the first electrode and an oxidizer supply groove [12] for supplying the oxidizer gas to the second electrode, and for holding the power generator (p. 9, para. 5); and,
- water disposal means [13, 15, 31] for disposing water generated during power generation by the power generator, provided at least on a midway portion of the oxidizer supply groove (Fig. 2(B); p. 6, para. 2; p. 7, para. 5 – p. 8, para. 1).

Regarding claim 79, Sakakibara discloses that the water disposal means [13, 15] is a water-absorbing member for absorbing the water (p. 5, para. 3 - p. 6, para. 1; p. 7, para. 5 - p. 8, para. 2; p. 8, para. 4 - p. 9, para. 4).

Regarding claim 80, Sakakibara discloses that the water-absorbing member [13] is provided along at least a partial region of a sidewall [B] of the oxidizer supply groove [11] (Fig. 1(B); p. 7, para. 5 - p. 8, para. 1).

Regarding claim 81, Sakakibara discloses that the water-absorbing member [13] is provided so as to cover at least a part of the surface having the oxidizer supply groove formed therein (Figs. 1(B), 2(A), 2(B); p. 7, para. 5 - p. 8, para. 1).

Regarding claims 83 and 84, the limitation recited in this claim has been addressed above with respect to claim 47 and 51, respectively.

Regarding claim 88, Sakakibara discloses that the water disposal means includes the oxidizer supply groove having a high water-repellent region formed therein (p. 4, para. 2).

Regarding claim 89, Sakakibara discloses that the water disposal means includes the oxidizer supply groove having a high hydrophilic region formed therein (p. 6, para. 2).

Regarding claim 91, Sakakibara discloses that a power generation section having a stacked structure in which a plurality of elements holding the power generator by the separator is stacked (Figs. 2(A), 2(B); p. 9, para. 5).

Regarding claim 92, the limitations recited in this claim have been addressed above with respect to claim 49.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 1795

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara as applied to claims 47-51 above, and further in view of Streckert et al. (US 6,447,945).

Sakakibara is applied and incorporated herein for the reasons above.

Regarding claims 52-53, Sakakibara does not expressly teach that the water-absorbing layer is provided on a surface of an electronic device to which the power generator is mounted, as being extended therefrom; or, that the water-absorbing member has any one of an irregular-shaped portion and a projected portion.

Streckert teaches a portable electronic device powered by fuel cells which include arrangements for effectively and efficiently removing water generated at such fuel cells from the interior of a case, such as a case which holds the commonly used laptop personal computers (Abstract; 1:40-44). The water transportation system 41, located in the lid of a laptop case as shown in Figs. 3, 8 and 9, employs a wick arrangement with a wick 43 (a braided or otherwise accumulated group of strands of polypropylene fiber or some other hydrophilic polymeric fiber) located adjacent the air outlet passages from the fuel cell unit 33, along a perimeter boundary of that section of the PC case containing the fuel cell unit (e.g. along one or both side edges of the lid) (Figs. 3, 8; 4:22-40). The wick 43 is disposed in a porous tube 45 that is positioned inside a generally coaxial porous outer tubular holder 47; thus, the wick is always exposed to the ambient environment, thus promoting evaporation at its surface (Figs. 4, 5; 4:41-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to dispose a water-absorbing layer of Sakakibara on a surface of an electronic device in the manner taught by Streckert to remove water generated by fuel cell operation from the interior of the device.

As to the water-absorbing member having any one of an irregular-shaped portion and a projected portion, it would have been an obvious matter of design choice to include an irregular-shaped portion and a projected portion, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art (e.g., *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)). See MPEP 2144.04 (IV).

9. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara and Streckert as applied to claims 47-53 above, and further in view of Chizawa et al. (US 6,613,467).

Sakakibara is applied and incorporated herein for the reasons above.

Regarding claim 54, Sakakibara and Streckert do not expressly teach that the water-retaining member is provided between the water-absorbing member and the electronic device.

Chizawa teaches a fuel cell system that using a temperature/humidity exchange portion 10, with a water retentive porous body 14, is disposed to contact a fuel cell stack 9, as shown in Figs. 2A, 2B (8:29-31, 8:49-55, 9:8-15).

One of ordinary skill in the art at the time of the invention would have it obvious to place a water-retentive member between a water-absorbing member and an electronic device of Sakakibara, as modified by Streckert, in the manner taught by Chizawa to move moisture out of the electronic device and maintain the humidity required for efficient operation of a fuel cell (see Chizawa, Abstract, 9:8-15).

Art Unit: 1795

10. Claims 55, 60 and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara as applied to claims 47-54, 58-59, 78-81 and 83-84 above, and further in view of Imahashi et al. (US 5,350,643).

Sakakibara is applied and incorporated herein for the reasons above.

Regarding claims 55 and 60, Sakakibara teaches a water-absorbing layer having at least water absorbency, air permeability and electro-conductivity and a current collector (p. 7, para. 4; p. 8, para. 2-3). One of ordinary skill would appreciate that the carbon black which can be included in the water-absorbing layer of Sakakibara is electroconductive.

Sakakibara does not expressly teach that the water-absorbing layer is provided between a diffusion layer and the current collector.

Imahashi teaches a fuel cell with gas diffusion electrodes 2 and 3, composed of catalyst layers 6 and 8 and diffusion layers 7 and 9 provided on the outer side of the respective catalyst layers, being fed hydrogen-containing gas and oxygen-containing gas to respective electrodes (Abstract; Fig. 1). One of ordinary skill in the art at the time of the invention would have found it obvious to include a gas diffusion layer on the cathode of Sakakibara, as taught by Imahashi, because the diffusion layer can serve to increase electron conduction through the cell (see Imahashi, 3:1-2).

Regarding claim 90, Sakakibara teaches that its fuel cell includes an air electrode, as discussed above.

However, Sakakibara does not expressly teach that the fuel gas includes a hydrogen gas.

Imahashi teaches that its fuel cell electrodes use hydrogen and oxygen to facilitate an electrochemical reaction that produces a current (1:11-55). One of ordinary skill in the art at the time of the invention would have found it obvious to use hydrogen as fuel for the power generation apparatus of Sakakibara because it is known in the art as molecule which easily ionizes into protons to releases electrons.

11. Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara as applied to claims 78-81 above, and further in view of Lisi (US 2003/0152821).

Sakakibara is applied and incorporated herein for the reasons above.

Regarding claim 82, the limitations recited in this claim have been addressed above with respect to claims 78 and 81, except for the separator having a heat sink portion; or, that the water-absorbing member is formed as to be a predetermined shape that extends from the heat sink portion.

Lisi teaches a composite separator plate for use in a fuel cell stack composed of a plate with a main body portion 100 defining the exemplary shape of the separator plate 26, a plurality of tubular members 102 disposed within the main body portion 100, formed of a material that is thermally conductive and not susceptible to corrosion from exposure to the gaseous reactant or coolants commonly used in a fuel cell stack, and a plurality of electrically conductive elements 104 extending through the main body portion 100 in a through-plane orientation (para. 27, 33, 34; Fig. 2). The conductive fibers 104 and tubular members 102 of the separator plate 26 enhance the transfer of electrical and thermal energy, respectively, to control the environment of the fuel cell stack (para. 27).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a heat sink in the separator of Sakakibara, as taught by Lisi, to control the temperature the fuel cell.

As to the water-absorbing member being formed as to be a predetermined shape that extends from the heat sink portion and covers at least a part of the oxidizer groove, one of ordinary skill in that art would appreciate that the water absorbing member of Sakakibara, which covers part of the oxidizer groove as discussed above with respect to claims 78 and 81, makes contact with the heat sink portions of the separator of Sakakibara, as modified by Lisi, at the ends of the separator. The artisan would also appreciate that this portion of the water absorbing member will have a predetermined shape.

12. Claims 85 and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara in as applied to claims 78-84 above, and further in view of Chizawa.

Sakakibara is applied and incorporated herein for the reasons above.

Regarding claim 85-86, Sakakibara teaches the water absorbing member includes a material that absorbs water by using capillary phenomenon, as discussed above.

However, Sakakibara does not expressly teach that the water-absorbing member comprises a three-layered structure in which a two-layered structure including a first material having a water-absorbing/releasing property and a second material having a water absorbency bonded with each other is further bonded with a predetermined tape material on the lower side of the second material.

Chizawa, discussed above, teaches that its porous water retentive porous body 14, which is required to be able to hold water and allow this water to evaporate upon a change of osmotic pressure, can be formed of a composite film composed of a fluorinated porous film laminated with a fibrous polymer material (9:5-15). The porous body is attached to a grooved, carbon separator plate through a sealing material 8 (8:56-65; Figs. 2A, 3A).

Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious to use a layered structure as the water absorbing member of Sakakibara, as taught by Chizawa, to further control the structure of the water absorbing member in efforts to ensure that absorbed water from fuel cell operations is effectively moved out of the cell.

13. Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakibara as applied to claims 78-86 above, and further in view of Nishida et al. (US 6,660,419).

Sakakibara is applied and incorporated herein for the reasons below.

Regarding claim 87, Sakakibara does not expressly teach that the oxidizer supply groove has a roughened surface.

Nishida teaches the performance of a fuel cell can be improved by roughening the surface of separator grooves for gas flow because contact resistance is reduced (14:24-41).

It would have been obvious to one of ordinary skill in the art at the time of the invention to roughen the surface of the oxidizer supply groove of Sakakibara, as taught by Nishida, to improve the performance of its power generation apparatus.

Correspondence / Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday-Thursday, 7 a.m. - 3 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dai-Weh Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 1795

/Edu E Enin-Okut/

Examiner, Art Unit 1795

/Dah-Wei D. Yuan/

Supervisory Patent Examiner, Art Unit 1795